REMARKS

By this response, withdrawn Claims 1-10 and 15-28 have been canceled without prejudice to or disclaimer of the subject matter contained therein; Claims 11 and 12 have been amended; and new Claims 29-44 have been added, leaving Claims 11-14 and 29-44 pending in the application. No new matter has been added by the amendments. Reconsideration and allowance are respectfully requested in view of the following remarks.

Rejection Under 35 U.S.C. § 102

Claims 11-14 stand rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,872,322 to Chow et al. for the reasons stated at numbered point (2), page 2, of the Official Action. The rejection is respectfully traversed.

Claim 11, as amended, recites "a silicon carbide component of a semiconductor substrate processing apparatus, the silicon carbide component being porous and comprising an interior and an exposed surface, the silicon carbide component having been (i) made by a carbon conversion process that results in the silicon carbide component including free-carbon in the interior; (ii) treated to produce an exposed surface having free-carbon therein; and (iii) treated to remove the free-carbon such that at least the exposed surface is substantially free of the free-carbon, wherein the silicon carbide component is selected from the group consisting of a baffle plate, a plasma confinement ring and an edge ring" (emphasis added). Support for the amendment to Claim 11 is provided, for example, in Claim 12.

According to Claim 11, the silicon carbide component is a baffle plate, a plasma confinement ring or an edge ring. The silicon carbide component has been

"made by a carbon conversion process that results in the silicon carbide component including free-carbon in the interior [of the component]." During the carbon conversion process, the carbon is not completely converted to SiC and, as a result, free-carbon is present in the interior of the component in the form of carbon particles or clusters. See paragraph [0021] of the specification. The free-carbon is distinct from the silicon carbide matrix material. As also recited in Claim 11, the silicon carbide component has been treated to produce an exposed surface having free-carbon therein. For example, the component can be mechanically ground or polished to produce the exposed surface. This treating can expose free-carbon on the exposed surface of the component. See paragraph [0024] of the specification. The free-carbon on the exposed surface of the component is undesirable because it can be a source of carbon particles ("adders") when the component is installed in a plasma processing chamber and exposed to plasma during processing of production semiconductor substrates. As recited in Claim 11, the silicon carbide component has been treated to remove free-carbon such that at least the exposed surface is substantially free of the free-carbon. Because the exposed surface of the silicon carbide component is substantially free of the free-carbon, when the component is installed in a plasma processing chamber, the generation of adder particles during the plasma processing of production semiconductor substrates is significantly reduced.

In contrast to the claimed silicon carbide component, Chow discloses a process for cleaning a chamber by removing residues formed on surfaces of walls and components of the chamber using different cleaning gas compositions. The components of the chamber can be made of various materials including silicon

carbide (column 7, lines 7-13 and 30-36). Chow is silent regarding the process that is used to make components from any one of the disclosed materials. Accordingly, Chow does not suggest making a silicon carbide component by a carbon conversion process that results in the component including free-carbon. Chow discloses that the cleaning process removes residue materials from the chamber surfaces simultaneously during the etching of production semiconductor substrates in the chamber (column 9, lines 1-4). Chow also discloses that cleaning can be performed after etching, or otherwise processing, the last residue-creating layer on the substrate (column 15, lines 7-11). The cleaning gas is added to the etchant gas in a volumetric ratio to remove the residue (column 11, 14-17). According to Chow, the volumetric ratio of the cleaning gas added to the etchant gas can be selected to remove substantially all of the etchant residues without eroding the chamber surfaces (column 11, lines 40-44). Chow also discloses that the reduced energy levels of the plasma used in the cleaning process result in much less erosive damage to the chamber as compared to conventional in-situ plasma cleaning steps (column 11, lines 62-65).

The Official Action asserts that Chow discloses an etching apparatus including silicon carbide components, such as chamber walls and substrate receiving surfaces. The Official Action further asserts that:

> These components would be porous, since it is made from the same material as that of claimed invention, SiC, and comprise of an interior and an exposed surface. These components further are treated with O2 plasma. Therefore, they would also include free-carbon in the interior and on the exposed surface. (Emphasis added).

The Official Action appears to assert that Chow's O_2 plasma treatment would produce free-carbon in the interior and on the exposed surface of Chow's parts.

However, Chow discloses that the cleaning process removes residues from the surfaces of chamber components without eroding the chamber surfaces. Chow does not disclose or suggest that the components, even if made of silicon carbide, must contain free-carbon resulting result from the process by which they are made. Moreover, Chow does not disclose or suggest that the cleaning process using an O_2 plasma produces free-carbon in the interior and on the exposed surface of the components, as asserted in the Official Action. Chow does not disclose or suggest that the components, even if made of silicon carbide, must contain free-carbon before, during or after the cleaning process. Accordingly, Chow does not support the rejection of Claim 11.

Furthermore, Chow does not disclose or suggest a baffle plate, plasma confinement ring or edge ring made of silicon carbide, as recited in Claim 11.

For at least the above-discussed reasons, Chow does not anticipate and would not have rendered obvious the silicon carbide component recited in Claim 11. Claims 12-14, which depend from Claim 11, are also patentable over Chow for at least the same reasons as those for which Claim 11 is patentable. Therefore, withdrawal of the rejection is respectfully requested.

New Claims

New Claims 29-34 depend from Claim 11 and thus are also patentable. Claim 29 recites the features of "the silicon carbide component is a new part." Support for the features recited in Claim 29 is found, for example, at paragraph [0030] of the specification, which describes that the silicon carbide component including free-carbon can be treated in a suitable vessel, such as a high-temperature oven or

furnace to remove free-carbon. The silicon carbide component that has been treated in this manner in the vessel is a new component, i.e., an as-treated part that has not been installed in a semiconductor substrate processing apparatus.

Claim 30 recites the features of "the silicon carbide component has not been exposed to plasma in a semiconductor substrate processing apparatus." That is, the silicon carbide component recited in Claim 30 can be a component that has not been installed in a semiconductor substrate processing apparatus, or one that has been installed in a semiconductor substrate processing apparatus, but has not been exposed to plasma in the apparatus.

Claim 31 recites the features of "the silicon carbide component has not been exposed to plasma during the processing of semiconductor substrates in a semiconductor substrate processing apparatus." Support for these features is found at paragraph [0038] of the specification. Chow's cleaning process cleans chamber surfaces either during the etching of production wafers or after the etching of such wafers by exposing the surfaces to plasma formed from the cleaning gas.

New independent Claim 35 recites "a silicon carbide component of a semiconductor substrate processing apparatus, the silicon carbide component comprising an interior and an exposed surface, the interior containing free-carbon and the exposed surface being substantially free of the free-carbon, wherein the silicon carbide component is selected from the group consisting of a baffle plate, a plasma confinement ring and an edge ring." Claim 35 and Claims 36-42, which depend from Claim 35, are also patentable.

New independent Claim 43 recites "a silicon carbide baffle plate of a semiconductor substrate processing apparatus, the baffle plate comprising an

interior and a machined exposed surface, the interior containing free-carbon particles or clusters and the exposed surface being substantially free of free-carbon." Claim 43 and Claim 44, which depends from Claim 43, are also patentable.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. If there are any questions concerning this response, the Examiner is respectfully requested to contact the undersigned at the number given below.

Respectfully submitted,

BUCHANAN INGERSOLL PC (INCLUDING ATTORNEYS FROM BURNS DOANE SWECKER & MATHIS)

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